

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim1 (currently amended): A railway train friction management system for managing and controlling an application of a one or more of a plurality of types of friction modifying agents to an area of contact between a railway wheel and a railway rail over which the wheel is traversing to selectively modify the coefficient of friction at the contact area, the system comprising:

- a sensor for detecting a parameter relating to an operation of the railway train;
- a controller responsive to the sensor for selecting at least one type of friction modifying agent as a function of the detected parameter and ~~for controlling the application of the~~ determining a period of time for application of the selected friction modifying agent to the rail as a function of the detected parameter, and
- an applicator responsive to the controller for applying the selected type of friction modifying agent to the area of contact between the railway wheel and the rail for the period of time.

Claim 2 (original): The system of claim 1, further comprising a locomotive having a first end and a second end, one of which is a leading end and the other of which is a trailing end; wherein the applicator is positioned on the trailing end of the locomotive and applies the friction modifying agent to the rail to reduce the coefficient of friction at the contact area for reduced wear and rolling resistance.

Claim 3 (original): The system of claim 1, wherein the applicator is positioned on a railway car traversing the railway rail and being moved by a locomotive along the railway rail such that the applicator applies the friction modifying agent to reduce the coefficient of friction at the contact area for reduced wear and rolling resistance.

Claim 4 (original): The system of claim 1, wherein the friction modifier agent is one that increases the coefficient of friction at the contact area for enhanced adhesion.

Claim 5 (currently amended): The system of claim 1, wherein the friction modifier agent is one that decreases the coefficient of friction at the contact area for diminished adhesion.

Claim 6 (original): The system of claim 1, wherein the friction modifier agent is one that removes another friction modifier agent from the contact area.

Claim 7 (original): The system of claim 4, wherein the friction modifier agent is one from a group of agents comprising sand, sand-like material, and air.

Claim 8 (original): The system of claim 5, wherein the friction modifier agent is one from a group of agents comprising air, steam, water, lubricating fluid, and oil.

Claim 9 (original): The system of claim 1, wherein the parameter is selected from the group of parameters comprising train speed, wheel speed, tractive effort (TE), throttle setting, acceleration, deceleration, braking condition, force, wheel slip/slide, fuel consumption, wheel creep, engine horsepower, and traction motor torque.

Claim 10 (original): The system of claim 1, further comprising auxiliary data wherein the controller retrieves the auxiliary data and is responsive to the parameter and the auxiliary data for controlling the application of the friction modifying agent to the rail.

Claim 11 (original): The system of claim 10, wherein the auxiliary data is selected from a group of auxiliary data comprising train length, train weight, track map, train location, track topography, track grade, track curvature, rail temperature, rail condition, current weather, forecast weather, train schedules, commands from operators, and commands from remote dispatch centers.

Claim 12 (original): The system of claim 1, wherein the applicator is configured to apply the friction modifying agent to a defined point of a rail configuration and wherein the controller controls the application of the friction modifying agent to the defined point of rail configuration.

Claim 13 (original): The system of claim 12, wherein the defined point of application is selected from a group of points of application comprising a wheel flange, a wheel rim, a top of the rail, and a rail gage side.

Claim 14 (original): The system of claim 1, wherein the controller determines timing of the application of the friction modifying agent by the applicator.

Claim 15 (original): The system of claim 1, wherein the controller determines quantity of the application of the friction modifying agent by the applicator.

Claim 16 (currently amended): A method for railway train friction management for managing and controlling an application of a one or more of a plurality of types of friction modifying agent to an area of contact between a railway wheel of a railway train and a railway rail over which a wheel is traversing to selectively modify a coefficient of friction at the contact area, the method comprising:

sensing a parameter related to the operation of the railway train;

selecting at least one type of friction modifying agent as a function of the sensed parameter; and

applying the selected type of friction modifying agent to the area of contact between the railway wheel and rail as a function of the sensed parameter.

Claim 17 (original): The method according to claim 16, further comprising determining the timing of applying the friction modifying agent and the quantity of friction modifying agent to be applied based on the sensed parameter, wherein the controlling is based on the determining of the timing and the quantity.

Claim 18 (original): The method according to claim 16 wherein applying the friction modifying agent includes applying a friction enhancing agent to enhance the friction of a wheel of a locomotive and applying a friction reducing agent to the rail prior to a wheel of a connected railway car.

Claim 19 (original): The method according to claim 16, further comprising controlling the application of a friction modifying agent to the rail responsive to the sensed parameter.

Claim 20 (currently amended): A railway train friction management system for managing and controlling an application of a one or more of a plurality of types of friction modifying agents to an area of contact between a railway wheel and a railway rail over which the wheel is traversing to selectively modify the coefficient of friction at the contact area, the system comprising:

a plurality of sensors for detecting parameters relating to an operation of the railway train;
 at least one controller responsive to input from at least one of the plurality of sensors for selecting at least one type of ~~controlling the application of the~~ friction modifying agent as a function of the detected parameter and determining an amount of the selected friction modifying agent to apply to the rail as a function of at least one of the sensed parameters; and

a plurality of applicators responsive to at least one controller for applying the determined amount of the selected type of friction modifying agent to the area of contact between the railway wheel and rail.

Claim 21 (original): The system of claim 20 including a train comprising a plurality of locomotives and a plurality of railway cars each having a plurality of railway wheels and at least some of the locomotives and/or railway cars having applicators thereon and wherein the at least one controller determines which applicators are to be operated to apply friction modifying agent to the area of contact between the railway wheel and rail.

Claim 22 (original): The system of claim 21 further comprising each locomotive having a first end and a second end, one of which is a leading end and the other of which is a trailing end; wherein the applicators are positioned on either or both the leading end and the trailing end of at least some of the locomotives.

Claim 23 (original): The system of claim 20 wherein the friction modifier agent is one that increases the coefficient of friction at the contact area for enhanced adhesion.

Claim 24 (original): The system of claim 20 wherein the friction modifier agent is one that decreases the coefficient of friction at the contact area for enhanced adhesion.

Claim 25 (original): The system of claim 20, wherein the friction modifier agent is one that removes another friction modifier agent from the contact area.

Claim 26. (original): The system of claim 23, wherein the friction modifier agent is one from a group of agents comprising sand, sand-like material, and air.

Claim 27 (original): The system of claim 24, wherein the friction modifier agent is one from a group of agents comprising air, steam, water, lubricating fluid, and oil.

Claim 28 (original): The system of claim 20, wherein the at least one parameter is selected from the group of parameters comprising train speed, wheel speed, tractive effort (TE), throttle setting, acceleration, deceleration, braking condition, force, wheel slip/slide, fuel consumption, wheel creep, engine horsepower, and traction motor torque.

Claim 29 (original): The system of claim 20, further comprising auxiliary data wherein the controller retrieves the auxiliary data and is responsive to at least one parameter and the auxiliary data for controlling the application of a friction modifying agent to the rail.

Claim 30 (original): The system of claim 29, wherein the auxiliary data is selected from a group of auxiliary data comprising train length, train weight, track map, train location, track topography, track grade, track curvature, rail temperature, rail condition, current weather, forecast weather, train schedules, commands from operators, and commands from remote dispatch centers.

Claim 31 (original): The system of claim 20, wherein the applicators are configured to apply the friction modifying agent to a defined point of a rail configuration and wherein the controller controls the application of the friction modifying agent to the defined point of rail configuration.

Claim 32 (original): The system of claim 31, wherein the defined point of application is selected from a group of points of application comprising a wheel flange, a wheel rim, a top of the rail, and a rail gage side.

Claim 33 (original): The system of claim 20, wherein the at least one controller determines timing of the application of the friction modifying agent by the applicators.

Claim 34 (original): The system of claim 20, wherein the controller determines quantity

of the application of the friction modifying agent by the applicators.

Claim 35 (currently amended): A method for railway train friction management for managing and controlling an application of a one or more of a plurality of types of friction modifying agent to an area of contact between railway wheel of a railway train and railway rail over which the wheel is traversing to selectively modify the coefficient of friction at the contact area, the method comprising:

sensing at least one parameter related to an operation of the railway train;
selecting at least one type of friction modifying agent as a function of the at least one sensed parameter; and
 applying at least one of the selected type of friction modifying agent to a selected area of contact between the railway wheel and rail as a function of the at least one sensed parameter.

Claim 36 (original): The method according to claim 35, further comprising determining the timing of applying the friction modifying agent based on the sensed parameter, wherein the controlling is based on the determining of the timing.

Claim 37 (original): The method according to claim 35, further comprising determining the quantity of friction modifying agent to be applied based on the sensed parameter, wherein the controlling is based on the determining of the quantity.

Claim 38 (original): The method according to claim 35, further comprising determining the timing of applying the friction modifying agent and the quantity of friction modifying agent to be applied based on the sensed parameter, wherein the controlling is based on the determining of the timing and the quantity.

Claim 39 (original): The method according to claim 35, wherein the step of applying the at least one friction modifying agent includes applying a friction enhancing agent to enhance the friction of a wheel of a locomotive and applying a friction reducing agent to the rail prior to a wheel of a connected railway car.

Claim 40 (original): The method according to claim 35, further comprising controlling the application of the friction modifying agent to the rail responsive to the at least one sensed

parameter.

Claim 41 (original): The method of claim 35 wherein the train includes a plurality of locomotives and a plurality of railway cars each having a plurality of railway wheels and one or more of the locomotives and/or railway cars have friction modifying applicators thereon and wherein the controlling of the friction modifying agent includes selecting which applicators are to be operated to apply friction modifying agent to the area of contact between the railway wheel and rail and then applying the friction modifying agent through operation of the selected applicators.

Claim 42 (original): The method of claim 35 wherein the step of applying at least one friction modifying agent includes applying one that increases the coefficient of friction at the contact area.

Claim 43 (original): The method of claim 35 wherein the step of applying at least one friction modifying agent includes applying one that decreases the coefficient of friction at the contact area.

Claim 44 (original): The method of claim 35 wherein the step of applying at least one friction modifying agent includes applying one that removes another friction modifier agent from the contact area.

Claim 45 (original): The method of claim 42 wherein the step of applying at least one friction modifying agent includes applying at least one selected from a group of agents comprising sand, sand-like material, and air.

Claim 46 (currently amended) The method of ~~claim 10~~ claim 43 wherein the step of applying at least one friction modifying agent includes applying at least one selected from a group of agents comprising air, steam, water, lubricating fluid, and oil.

Claim 47 (original): The method of claim 35 wherein the step of selecting at least one parameter includes selecting from the group of parameters comprising train speed, wheel speed, tractive effort (TE), throttle setting, acceleration, deceleration, braking condition, force, wheel

slip/slide, fuel consumption, wheel creep, engine horsepower, and traction motor torque.

Claim 48 (original): The method of claim 35, further comprising the selection of auxiliary data and the applying of at least one modifying agent is a function of the auxiliary data and the at least one parameter.

Claim 49 (original): The method of claim 48 wherein the auxiliary data is selected from a group of auxiliary data comprising train length, train weight, track map, train location, track topography, track grade, track curvature, rail temperature, rail condition, current weather, forecast weather, train schedules, commands from operators, and commands from remote dispatch centers.

Claim 50 (new): The system of claim 1, wherein the detected parameter indicates a sensed tractive effort, and wherein the controller determines the period of time for applying the selected friction modifying agent as a function of a comparison of the sensed tractive effort to a desired tractive effort.

Claim 51 (new): The system of claim 50, wherein the controller determines to begin application of the friction modifying agent when the sensed tractive effort is lower than the desired tractive effort, and wherein the controller determines to end application of the friction modifying agent at the when the sensed tractive effort is equal to or greater than the desired tractive effort.

Claim 52 (new): The system of claim 20 wherein at least one controller determines the amount of the selected friction modifying agent to apply to the rail by determining a quantity or a dispensation rate of the friction modifying agent to be applied.

Claim 53 (new): A railway train friction management system for managing and controlling an application of one or more of a plurality of types of friction modifying agents to an area of contact between a railway wheel and a railway rail over which the wheel is traversing to selectively modify the coefficient of friction at the contact area, the system comprising:

a sensor for detecting a parameter relating to an operation of the railway train;

a controller responsive to the sensor for determining whether to apply a friction enhancing agent or a friction diminishing agent on the rail as a function of the detected parameter and for determining an amount of the determined agent to apply to the rail as a function of the detected parameter; and

an applicator responsive to the controller for applying the determined amount of the determined type of friction modifying agent to the area of contact between the railway wheel and the rail.